Exercise 005.1 - Kinematic Equations

1) A boat accelerates from rest down the street at 3.20 m/s^2 for 32.8 seconds. Determine the distance traveled.

2) A car starts from rest and accelerates uniformly over a time of 5.21 seconds for a distance of 110 metres. Determine the acceleration of the car.

3) John is riding the "Big-Drop" at Rainbow's End. If John free-falls for 2.6 seconds, what will be his final velocity and how far will he fall?

4) A racecar accelerates uniformly from 18.5 m/s to 46.1 m/s in 2.47 seconds. Determine the acceleration of the car and the distance traveled.

5) A feather is dropped on the moon from a height of 1.40 meters. The acceleration of gravity on the moon is 1.67 m/s^2. Determine the time for the feather to fall to the surface of the moon.

6) A cat is capable of jumping to a height of 2.62 metres. Determine the takeoff speed of the cat.

7) If a basketball player has a vertical leap of 1.29 metres, then what is his takeoff speed and his hang time (total time to move upwards to the peak and then return to the ground)?

Exercise 005.2 – Where is the javelin?

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Project: Ex2

Create a function **javelin** that takes throw angle, throw speed and time as arguments and calculates the position and angle of a javelin over time. During its flight, a javelin is more or less oriented along the tangent to the curve, parallel to the velocity vector.

Exercise 005.3 – Angle to fire the cannon

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Project: Ex3

Write a function named **aimCannon** that takes cannon length, muzzle speed, and aim point as arguments and calculates the correct firing angle for the cannon to hit a particular point.